

REMARKS

This is in response to the Office Action of November 23, 2009. Claims 1-8 remain pending in the application. A typographical correction is made to claim 5. Specifically, a comma is inserted between 3' and 4 in the name “3,3',4,4'-benzophenonetetracarboxylic.” This is a non-narrowing amendment. No new matter is introduced into the application by this Amendment.

No prima facie obviousness

Claims 1-8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over US 5,071,997 (Harris). Office Action, pages 2-5. The rejection is respectfully traversed.

The statute requires the consideration of an applicant's invention “as a whole.” In the present situation, the Examiner has not focused on the fact that claims 1 and 2 are drawn to particular polyamic acids while claims 3-6 are drawn to polyimides made from the polyamic acids and claims 7 and 8 are drawn to methods of making the polyimides from the polyamic acids. Instead, the Examiner has focused on one type of embodiment for a substituent from among many different possibilities for that substituent.

Thus, while Harris discloses compounds that are similar in some respects to compounds embraced by Applicants' claims, in the Harris compounds, the moieties which correspond to the -OR substituent (that is, alkoxy substituent) in Applicants' compounds are depicted as “-A.” All of the specifically disclosed embodiments of aromatic polyimides in Harris show the “-A” substituent as being a trifluoromethyl group. Harris provides a generic teaching – in lines 2-11 of column 11 – that the “A” group may be “an alkyl group, a substituted-alkyl group ..., a cyano group, an alkyl group, a nitro group, a thioalkyl group, an alkoxy group, an aryl group or a substituted aryl group.” Considering the reference disclosure as a whole, this generic disclosure in Harris, coupled with the Harris specific disclosure of trifluoromethyl groups as embodiments of “A,” would *not* lead persons of ordinary skill in the art to a hydrocarbon group having 3 to 6 carbon atoms as required by Applicants' claims.

HINDSIGHT SELECTION. On page 2 of the Office Action, the Examiner contends that "Harris teaches ... a diamine ... [wherein] ... A is Alkoxy group (see Column 2, line 20)." This is an over-simplification, and as such is misleading. What Harris actually teaches in column 2 – regarding the generic formula of substituted benzidines depicted therein having "A" and "Z" substituents – is that A is "to be selected from the representative group consisting of halogen, viz. fluoride, chloride, iodide and bromide; alkyl, substituted-alkyl such a halogenated alkyls, nitro, cyano, thioalkyl, alkoxy, aryl or substituted-aryl such as halogenated aryl." That is, Harris provides a generic formula in which one of the types of variables represents a variety of different types of substituents. It is the Examiner, not the reference, that singles out the alkoxy embodiments from the list recited by the reference. The *Examiner's selection* of alkoxy from the list in the reference is based upon Applicants' teachings rather than upon any teaching in the reference itself or in the knowledge attributable to a person of ordinary skill in the art. It is respectfully submitted that the rejection of record is accordingly unsustainable, as being based upon improper hindsight.

WHERE IS THE PRIOR ART SPECIES? At the top of page 5 of the Office Action, the Examiner contends that it is obvious "to use Alkoxy radicals containing 3-6 Carbons in Harris reference, since they are structural homologs to *species disclosed by the reference*." (Emphasis added.) The Examiner is respectfully requested to identify *the polyamic acid species disclosed by the reference* which is being used to reject claims 1 and 2, and to identify *the polyimide species disclosed by the reference* which is being used to reject claims 3-6.

103, NOT 102. On page 6 of the Office Action, the Examiner conceded that the Rule 132 Declaration of record demonstrates that Applicants' invention is superior to a specifically disclosed embodiment in Harris. The Examiner argues, however, that "when the species is clearly named, *the species claim is anticipated* no matter how many other species are additionally named." (Emphasis added.) The Examiner cites "Ex parte A" and MPEP 2131.02. What species claim is anticipated here? What "species is clearly named" here? The Examiner's position in this regard might have merit in a rejection under 35 U.S.C. § 102. The Examiner's position in this regard is manifestly irrelevant to the rejection of record under 35 U.S.C. § 103(a).

REJECTION CONTRARY TO MPEP. Further on in MPEP 2131.02, under the heading “A GENERIC CHEMICAL FORMULA WILL ANTICIPATE A CLAIMED SPECIES COVERED BY THE FORMULA WHEN THE SPECIES CAN BE ‘AT ONCE ENVISAGED’ FROM THE FORMULA,” it is pointed out that “when “it is necessary to select portions of teachings within a reference ..., anticipation can only be found if the classes of substituents are sufficiently limited or well delineated.” At the very end of MPEP 2131.02, it is pointed out, for instance, that claims to a process for making aramid fibers using a 98% solution of sulfuric acid were not anticipated by a reference which disclosed using sulfuric acid solution but which did not disclose using a 98% concentrated sulfuric acid solution. Similarly, the presently claimed polyamic acids and polyimides are neither anticipated by nor rendered irrebuttably obvious by the Harris disclosure of a generic formula of substituted benzidines having “A” and “Z” substituents wherein A is “to be selected from the representative group consisting of halogen, viz. fluoride, chloride, iodide and bromide; alkyl, substituted-alkyl such a halogenated alkyls, nitro, cyano, thioalkyl, alkoxy, aryl or substituted-aryl such as halogenated aryl.”

In summary, Applicants do not believe that the present claims contain subject matter that is rendered *prima facie* obvious by the generic disclosure of Harris. In any event, any theoretical *prima facie* case of obviousness based upon Harris is rebutted by the unexpected beneficial results demonstrated in the Rule 132 Declaration of record¹.

UNEXPECTED BENEFICIAL PROPERTIES

Even if the Examiner had established a *prima facie* case of obviousness with respect to the present invention – which he has not, as discussed in detail hereinabove – any such *prima facie* case of obviousness would be overcome by unexpected beneficial properties provided by the present invention. Unexpected beneficial properties are established in the Rule 132

¹ The ‘Declaration under 37 CFR 1.132’ made of record in connection with the Amendment filed August 12, 2009 establishes that the polyimides of the present invention are unexpectedly superior to the polyimides of Harris. For instance, the presently claimed polyimides are unexpectedly superior to the Harris polyimides with respect to chemical stability, and, moreover, the present polyimides are subject to little or no solvent solubility.

Declaration of record (filed August 12, 2009). Additional evidence of unexpected beneficial properties provided by this invention is of record in applicants' specification, as follows:

Polyimides in accordance with the present invention are synthesized from diamines and acid dianhydrides. In Examples 5-8, the diamine is m-NPOB (2,2'-di-n-propyloxybenzidine) and a variety of acid dianhydrides is used. In Examples 9-14, the diamine is m-PHOB (2,2'-diphenyloxybenzidine) and a variety of acid dianhydrides is used. When comparing Examples 1-4 or Comparative Examples 1-3 with Examples 5-8 or Examples 9-14, in order to judge the effect of the diamine, it is necessary to compare compounds made with the same acid dianhydride, in order to eliminate the influence on the comparison of the type of acid dianhydride. The following example groupings eliminate the effect of the acid dianhydride component:

- (A) Example 1, Example 5, Example 10, Comparative Example 1;
- (B) Example 2, Example 6, Example 11, Comparative Example 3;
- (C) Example 3, Example 7, Example 12, Comparative Example 2.

In group A, Example 5 and Example 10 have significantly lower numeric values of coefficient of moisture absorption (CMA) and coefficient of humidity expansion (CHE) than do Example 1 and Comparative Example 1. In group B, Example 6 and Example 11 have significantly lower numeric values of coefficient of moisture absorption (CMA) and coefficient of humidity expansion (CHE) than do Example 2 and Comparative Example 3. In group C, Example 7 and Example 12 have significantly lower numeric values of coefficient of moisture absorption (CMA) and coefficient of humidity expansion (CHE) than do Example 3 and Comparative Example 2.

The coefficient of linear expansion values across the inventive and comparative compositions do not vary greatly. Therefore, unexpectedly, the polyimides of the present invention successfully reduce the numeric values of CMA and CHE while not affecting the value of CTE.

Also, surprisingly, Applicants' polyimides are quite stable from the point of view of

their chemistry, and Applicants' polyimides are unsuited for wet etching processing. That is to say, the polyimide of the present invention – unlike conventional polyimides – have surprisingly been found to excel in terms of stability and to have excellent solvent resistance.

Nothing in the prior art of record teaches or suggests these unexpected beneficial aspects of the presently claimed invention. Accordingly, the obviousness rejection should be withdrawn.

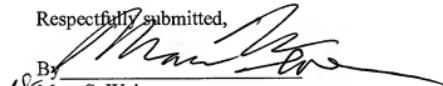
Contact information

If there are any questions concerning this application, the Examiner is invited to contact Richard Gallagher, Registration No. 28,781, at (703) 205-8008.

No fee is believed to be necessary in connection with this response. If any fee is determined to be necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.147; particularly, extension of time fees.

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Respectfully submitted,


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